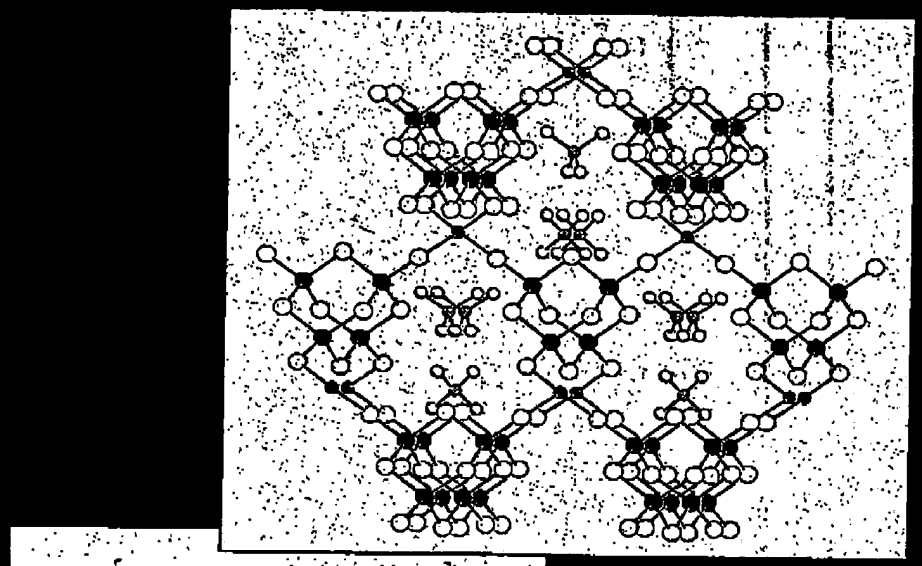
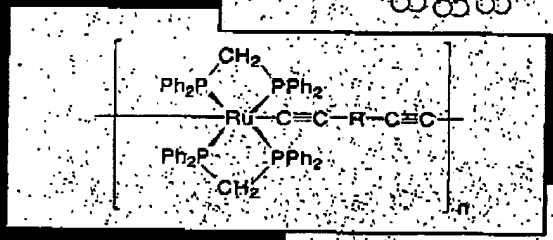
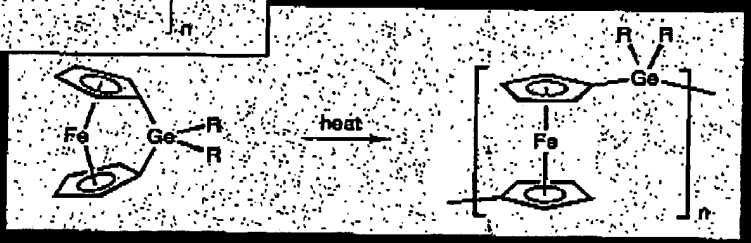
Exhibit B

Metal-Containing Polymeric Materials







Edited by Charles U. Pittman, Jr., Charles E. Carraher, Jr., Martel Zeldin, John E. Sheats, and Bill M. Culbertson

INORGANIC AND ORGANOMETALLIC POLYMERS - AN OVERVIEW

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INTRODUCTION

In the years since we organized our first symposium on inorganic and organometallic polymers in 1971[1] and five subsequent symposia in 1977,[2] 1979,[3] 1985,[4] 1989,[5] and 1994,[6] we have seen this field produce a wide variety of materials with diverse applications such as polymeric conductors and semiconductors, preceramic materials, polymer bound catalysts, shields for UV and other high energy radiation, biosensors, polymers with high thermal stability, flame retardency, and a wide variety of applications. Indeed, what can be expected when you incorporate the entire periodic table into a field that formerly had concentrated primarily on C, H, N, O, S, Si and the halogens?

Other groups of researchers[7] have also endeavored to summarize developments in this field and a new journal, the *Journal of Inorganic and Organometallic Polymers*, arose from the 1989 symposium and is now in its fifth year, having weathered many of the storms and shoals that sink new journals.

To summarize all of the developments in this diverse field is beyond the scope of this short review. For a more detailed discussion, we refer the reader to the excellent reviews by Manners for the years 1991-94[8], to the works previously cited and to the *Journal of Inorganic and Organometallic Polymers*. What we will try to accomplish is to summarize developments in four major areas: Silanes and Siloxanes; Phosphazenes, Carbo, Thio and Thionylphosphazenes; Coordination Polymers and other polymers containing transition metals in their backbone and Metallocene Polymers.

The goal is not only to summarize what has happened in these fields, but also to predict directions future research may take. A distinction is made between organometallic polymers, which contain the metal atom as an intimate part of the polymeric backbone in

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POLY(PHENYLMETALLOSILOXANE)S: SYNTHESIS, STRUCTURE AND PROPERTIES

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INTRODUCTION

The synthesis and the study of metallosiloxane polymers is of a considerable interest due to their unique properties, which include high thermal stability and electrical conductivity. The chemistry of metallosiloxane polymers has already been studied for 25–30 years. The question about their structure was open until the beginning of 1990 when we have first obtained and structurally characterized poly(phenylmetallosiloxane)s (PPMS), containing bivalent transition metal atoms: nickel, manganese, copper and cobalt[1–4], which were named the cage-like poly(phenylmetallosiloxane)s[3].

In this paper we consider the problems of the synthesis and the structure of two types of PPMS, produced from polyfunctional sodium phenylsiloxanolate (SPS). The first type is PPMS based on the bivalent transition metals and the second one is poly(phenylironsiloxane) (PPIS) which is an example of an amorphous PPMS with a trivalent transition metal.

Structure investigation of the first type of PPMS is based on the combination of X-ray diffraction analysis, decomposition trimethylsilylation and gel permeation chromatography (GPC). A complex approach, including GPC, preparative fractionation, spectral techniques and elemental analysis in combination with decomposition trimethylsilylation is employed to investigate poly(phenylironsiloxane) (PPIS) which is not able to crystallize.

The last part of the paper considers the magnetic properties and thermo-condensation of PPIS which is of interest from the practical point of view.

RESULTS AND DISCUSSION

The poly(phenylmetallosiloxane)s, containing transition metal atoms (Ni, Mn, Co, Cu, Fe and Ln) are obtained by the exchange interaction between sodium phenylsiloxanolate with transiton metal chlorides. Their synthesis includes three stages:

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